

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re: Application of	:	PATENT APPLICATION
James O'Dwyer et al.	:	
Serial No.: 10/635,796	:	Group Art Unit: 1713
Filed: August 6, 2003	:	Confirmation No. 2706
For: ETHERIFIED CARBAMATE FUNCTIONAL	:	Customer No. 24959
COPOLYMERS OF ISOBUTYLENE TYPE	:	Examiner: William K. Cheung
MONOMERS AND THEIR USE IN	:	
<u>CURABLE COMPOSITIONS</u>	:	Attorney Docket No.: 1873A1/RC

**APPEAL BRIEF**

MAIL STOP APPEAL BRIEF - PATENTS  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Sir:

In response to the Office Action mailed May 24, 2006, a Notice of Appeal was filed August 22, 2006, and this Appeal Brief is filed in compliance with 37 CFR 41.37(c). Appellants file this Appeal Brief, with the Board of Appeals and Interferences based on the rejections made in the Office Action mailed September 6, 2006.

I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to: Mail Stop Appeal Brief-Patents, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450

on January 22, 2007  
Date

Maria Edwards  
Signature

Maria Edwards  
Typed or Printed Name of Person Signing Certificate

### **REAL PARTY IN INTEREST**

The application has been assigned to PPG Industries Ohio, Inc., Cleveland, Ohio.

### **RELATED APPEALS AND INTERFERENCES**

No other related appeals or interferences relating to this patent case have been filed.

### **STATUS OF CLAIMS**

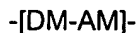
Claims 1, 5-23, 26-31, 40, 43-52 and 55-57 are pending. Claims 1, 5-23, 26-31, 40, 43-52 and 55-57 are rejected and appealed.

### **STATUS OF AMENDMENTS**

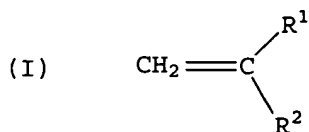
A Final Rejection was mailed on May 24, 2006. An Amendment after Final Rejection was filed in this case on August 24, 2006. An Advisory Action was mailed on September 6, 2006.

### **SUMMARY OF CLAIMED SUBJECT MATTER**

Claim 1 of the present invention is directed to a reaction product of reactants (see page 6, line 12 through page 7, line 2), wherein the reactants comprise: a) at least one copolymer (see page 10, lines 3-10 and 23-28) comprising at least 30 mol % of residues having the following alternating structural units:



wherein DM represents a residue from a donor monomer (see page 9, lines 7-10 and page 12, lines 1-4 and 15-28), AM represents a residue from an acceptor monomer (see page 9, lines 10-12 and page 12, line 29 through page 14, line 31), at least 15 mol % of the copolymer comprising a donor monomer having the following structure (I) (see page 10, lines 12-22 and page 12, lines 4-14):



wherein R<sup>1</sup> is linear or branched C<sub>1</sub> to C<sub>6</sub> alkyl, R<sup>2</sup> is selected from the group consisting of linear, cyclic or branched C<sub>1</sub> to C<sub>20</sub> alkyl, alkenyl, C<sub>6</sub> to C<sub>20</sub> aryl, alkaryl and aralkyl, at least 15 mol % of the copolymer comprising an acrylic monomer as an acceptor monomer; the copolymer containing pendant carbamate groups or groups that can be converted to carbamate groups;

b) at least one aldehyde (see page 22, lines 15-29); and

c) at least one monohydric alcohol (see page 22, line 30 through page 23, line 12);

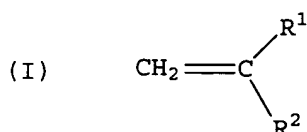
wherein when the copolymer (a) contains groups that can be converted to carbamate groups (see page 23, lines 13-16), the reactants further comprise:

d) at least one material that will convert said groups into carbamate groups (see page 23, lines 16-31).

Claim 40 of the present invention is directed to a copolymer comprising at least 30 mol % of residues having the following alternating structural units (see page 25, lines 1-14):



wherein DM represents a residue from a donor monomer (see page 9, lines 7-10 and page 12, lines 1-4 and 15-28), AM represents a residue from an acceptor monomer (see page 9, lines 10-12 and page 12, line 29 through page 14, line 31), at least 15 mol % of the copolymer comprising a donor monomer having the following structure (I) (see page 10, lines 12-22 and page 12, lines 4-14):



wherein  $\text{R}^1$  is linear or branched  $\text{C}_1$  to  $\text{C}_6$  alkyl,  $\text{R}^2$  is selected from the group consisting of linear, cyclic or branched  $\text{C}_1$  to  $\text{C}_{20}$  alkyl, alkenyl,  $\text{C}_6$  to  $\text{C}_{20}$  aryl, alkaryl and aralkyl, at least 15 mol % of the copolymer comprising an acrylic monomer as an acceptor monomer (see page 13, line 19 through page 14, line 17); the copolymer containing pendant groups of the structure (see page 25, line 11):



where  $\text{R}'$  is alkyl containing one to eight carbon atoms and  $\text{R}''$  is selected from H,  $\text{CH}_2\text{OR}'$ , linear, cyclic or branched  $\text{C}_1$  to  $\text{C}_{20}$  alkyl, alkenyl,  $\text{C}_6$  to  $\text{C}_{20}$  aryl, alkaryl and aralkyl (see page 25, lines 12-14).

### **GROUND OF REJECTION TO BE REVIEWED ON APPEAL**

1. Claims 40, 43-52 and 55-57 are rejected under 35 U.S.C. 102(e) as anticipated by United States Patent 6,787,597 (Martin).
2. Claims 1, 5-23 and 26-31 are rejected under 35 U.S.C. 102(e) as anticipated by United States Patent 6,787,597 (Martin).

### **ARGUMENT**

#### **Rejection of Claims 40, 43-52 and 55-57 under 35 U.S.C. 102(e) as anticipated by United States Patent 6,787,597 (Martin)**

It is alleged that the Martin reference (column 4, line 26-57; column 17, line 36-48) discloses a copolymer comprising at least 30 mol % of residue having alternating structural units, at least 15 mol % of acrylic monomer and at least 15 mol % of donor monomer. It is further alleged that the Martin reference (column 6, lines 35-60) discloses that carbamate functional groups can be included in the acrylic polymer by copolymerizing the acrylic monomers with a carbamate functional vinyl monomer, and a copolymer containing pendant carbamate groups is obtained. Appellants respectfully traverse this rejection.

Appellants submit that the Martin reference discloses a film-forming composition comprising a polymeric binder, crosslinking agent and copolymer. The copolymer may be further reacted, such as in a transcarbamoylation reaction, to produce a carbamate functional copolymer. For example, a copolymer containing hydroxyethyl groups can be treated with a carbamoylating agent, such as methyl carbamate, (see column 25, lines 3-7) to produce a carbamate functional copolymer containing pendent groups of the structure O-C(O)-NH<sub>2</sub>. In the present invention, the copolymer containing pendent carbamate groups is reacted directly with aldehyde and monohydric alcohol to form a copolymer containing pendent groups of the structure -OC(O)N(R'')CH<sub>2</sub>OR' wherein R' is alkyl containing C<sub>1</sub> to C<sub>8</sub> and R'' is selected from H, CH<sub>2</sub>OR', linear, cyclic or branched C<sub>1</sub> to C<sub>20</sub> alkyl, alkenyl, C<sub>6</sub> to C<sub>20</sub> aryl, alkaryl and aralkyl (see claim 40). The copolymer formed in the Martin reference contains pendent groups different than those formed on the copolymer backbone of the present invention. Appellants submit that the present invention is distinguished from the disclosure in the Martin reference and therefore, this rejection under 35 U.S.C. 102(e) should not stand.

Rejection of Claims 1, 5-23 and 26-31 under 35 U.S.C. 102(e) as anticipated by  
United States Patent 6,787,597 (Martin)

It is alleged that the Martin reference discloses (column 27, line 21; column 29, table; column 31, table) a copolymer comprising monohydric alcohol and a composition comprising aldehydes (column 9, lines 5-20). Appellants respectfully traverse this rejection.

Appellants submit that the Martin reference discloses a composition comprising a polymeric binder (a) in combination with a crosslinking agent (b). Also present in the composition is a copolymer (c) having  $-\text{[DM-AM]}-$  structural units which contain pendent carbamate groups or groups that can be converted to carbamate groups. As mentioned above, the Martin reference discloses a copolymer that does not contain groups of the structure  $-\text{OC(O)N(R'')CH}_2\text{OR}'$  (see claim 40). In the Martin reference, the pendent groups are of the structure  $-\text{O-C(O)-NH}_2$ . Further, the reference to alcohols and aldehydes in the Martin reference does not change the situation. The reference to alcohols in the Table of column 27 shows the alcohols as solvents in the polymerization of isobutylene and diisobutylene monomers. No carbamate groups are formed in the polymerization reaction as shown in the Table of column 27. In the Table of columns 29 and 30, the alcohols shown are used as solvents or additives for various film-forming compositions. The alcohols are not reactants and the various polymers and copolymers shown in the Table do not contain carbamate groups. The reference to aldehydes in column 9, lines 5-20, is related to forming the crosslinking agent (b). Specifically, an aldehyde and optionally an alcohol can be reacted with an amino or amido group carrying substance, such as a melamine, urea or benzoguanamine. However, there is no disclosure nor even suggestion in the Martin reference of reacting the aldehyde and alcohol with the copolymer having the  $-\text{[DM-AM]}-$  structural units that contain pendant carbamate groups or groups that can be converted to carbamate groups and therefore, this rejection under 35 U.S.C. 102(e) should not stand.

For all of the above reasons, it is respectfully requested that the case be remanded to the Examiner for issuance of a Notice of Allowance.

Respectfully submitted,



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Pittsburgh, Pennsylvania  
January 22, 2007

## CLAIMS APPENDIX

1. (Previously Presented) A reaction product of reactants, wherein the reactants comprise:

a) at least one copolymer comprising at least 30 mol % of residues having the following alternating structural units:



wherein DM represents a residue from a donor monomer, AM represents a residue from an acceptor monomer, at least 15 mol % of the copolymer comprising a donor monomer selected from isobutylene, diisobutylene, dipentene, and/or isoprenol at least 15 mol % of the copolymer comprising an acrylic monomer as an acceptor monomer; the copolymer containing pendant carbamate groups or groups that can be converted to carbamate groups;

b) at least one aldehyde; and

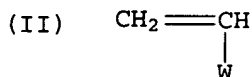
c) at least one monohydric alcohol;

wherein when the copolymer (a) contains groups that can be converted to carbamate groups, the reactants further comprise:

d) at least one material that will convert said groups into carbamate groups.

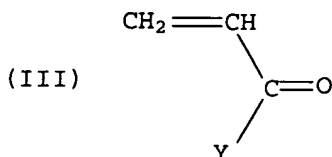
Claims 2 – 4 (Cancelled)

5. (Original) The reaction product of claim 1, wherein the acceptor monomer comprises one or more described by the structure (II):



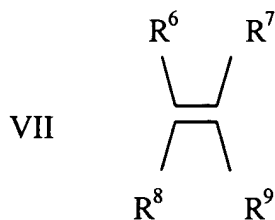
wherein W is selected from the group consisting of linear or branched C<sub>1</sub> to C<sub>20</sub> alkyl and alkylol.

6. (Original) The reaction product of claim 1, wherein the acrylic monomer is one or more described by structure (III):



wherein Y is -OR<sup>4</sup>, and R<sup>4</sup> is linear or branched C<sub>1</sub> to C<sub>20</sub> alkyl, alkylol or carbamoyl alkyl.

7. (Original) The reaction product of claim 6, wherein Y includes at least one hydroxyl group or carbamate group.
8. (Original) The reaction product of claim 1, wherein the copolymer has a molecular weight of from 250 to 100,000.
9. (Original) The reaction product of claim 1, wherein the copolymer has a polydispersity index of less than 4.
10. (Original) The reaction product of claim 1, wherein the alternating structural units comprise at least 50 mol % of the copolymer.
11. (Original) The reaction product of claim 1, wherein the acceptor monomer is one or more selected from the group consisting of hydroxyethyl acrylate, hydroxypropyl acrylate, 4-hydroxybutyl acrylate, 2-carbamoyloxyethylacrylate, and 2-carbamoyloxypropyl acrylate.
12. (Original) The reaction product of claim 11, wherein the acceptor monomer is 4-hydroxybutyl acrylate.
13. (Original) The reaction product of claim 1, wherein the copolymer comprises one or more residues derived from other ethylenically unsaturated monomers of general formula VII:



wherein R<sup>6</sup>, R<sup>7</sup>, and R<sup>9</sup> are independently selected from the group consisting of H, CF<sub>3</sub>, straight or branched alkyl of 1 to 20 carbon atoms, aryl, unsaturated straight or branched alkenyl or alkynyl of 2 to 10 carbon atoms, unsaturated straight or branched alkenyl of 2 to 6

carbon atoms substituted with a halogen, C<sub>3</sub>-C<sub>8</sub> cycloalkyl, heterocyclyl and phenyl, R<sup>8</sup> is selected from the group consisting of H, C<sub>1</sub>-C<sub>6</sub> alkyl, and COOR<sup>10</sup>, wherein R<sup>10</sup> is selected from the group consisting of H, an alkali metal, a C<sub>1</sub> to C<sub>6</sub> alkyl group, and C<sub>6</sub> to C<sub>20</sub> aryl.

14. (Original) The reaction product of claim 13, wherein the other ethylenically unsaturated monomers are one or more selected from the group consisting of (meth)acrylic monomers and allylic monomers.
15. (Original) The reaction product of claim 1 wherein the groups that can be converted to carbamate groups are hydroxyl groups and (d) is a carbamate-containing material that is reactive with the hydroxyl groups.
16. (Original) The reaction product of claim 15 wherein (d) is methyl carbamate.
17. (Original) The reaction product of claim 1 wherein the aldehyde is formaldehyde.
18. (Original) The reaction product of claim 1 wherein the monohydric alcohol is selected from at least one of methanol, ethanol, n-propanol, isopropanol, n-butanol, isobutanol, and cyclohexanol.
19. (Original) The reaction product of claim 1 wherein the copolymer is substantially free of maleate monomer segments and fumarate monomer segments.
20. (Original) The reaction product of claim 1 wherein the copolymer is prepared in the absence of Lewis acids and transition metals.
21. (Original) The reaction product of claim 1, wherein said reaction product has an equivalent weight of from 125 to 3000, based on etherified carbamate functional groups.
22. (Original) A curable composition comprising the reaction product of claim 1.
23. (Original) A curable composition comprising:
  - a) the reaction product of claim 1 and
  - b) at least one material having functional groups that are reactive with the reaction product of a).

Claims 24 - 25 (Cancelled)

26. (Original) The curable composition of claim 23, wherein the material b) has functional groups selected from the group consisting of hydroxyl, methylol, methylol ether, carboxylic acid, amide, thiol, urea, carbamate, thiocarbamate, and mixtures thereof.

27. (Original) The curable composition of claim 26, wherein the material b) is a polymer selected from the group consisting of acrylic, polyester, polyether and polyurethane polymers including mixtures thereof.

28. (Original) The curable composition of claim 23 wherein the material b) is an aminoplast.

29. (Original) The curable composition of claim 27, further comprising at least one auxiliary crosslinking agent different from a) and b), present in amounts of 1 to 50 percent by weight based on total weight of resin solids in the curable composition.

30. (Original) The curable composition of claim 29, wherein the auxiliary crosslinking agent is selected from at least one of polyisocyanates; triazine compounds of the formula:  $C_3N_3(NHCOXR)_3$ , wherein X is nitrogen, oxygen, sulfur, phosphorus, or carbon, and R is a lower alkyl group having one to twelve carbon atoms, or mixtures of lower alkyl groups; and aminoplasts; and the material b) has functional groups that are reactive with the auxiliary crosslinking agent.

31. (Original) The curable composition of claim 30, wherein the auxiliary crosslinking agent is a polyisocyanate, and wherein at least a portion of the isocyanate groups are capped.

Claims 32 -39 (Cancelled)

40. (Previously Presented) A copolymer comprising at least 30 mol % of residues having the following alternating structural units:



wherein DM represents a residue from a donor monomer, AM represents a residue from an acceptor monomer, at least 15 mol % of the copolymer comprising a donor monomer

selected from isobutylene, diisobutylene, dipentene and/or isoprenol, at least 15 mol % of the copolymer comprising an acrylic monomer as an acceptor monomer; the copolymer containing pendant groups of the structure:



where R' is alkyl containing one to eight carbon atoms and R'' is selected from H, CH<sub>2</sub>OR', linear, cyclic or branched C<sub>1</sub> to C<sub>20</sub> alkyl, alkenyl, C<sub>6</sub> to C<sub>20</sub> aryl, alkaryl and aralkyl.

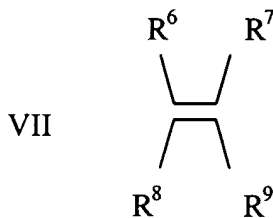
Claims 41 – 42 (Cancelled)

43. (Original) The copolymer of claim 40, wherein the copolymer has a molecular weight of from 250 to 100,000.

44. (Original) The copolymer of claim 40, wherein the copolymer has a polydispersity index of less than 4.

45. (Original) The copolymer of claim 40, wherein the alternating structural units comprise at least 50 mol % of the copolymer.

46. (Original) The copolymer of claim 40, wherein the copolymer comprises one or more residues derived from other ethylenically unsaturated monomers of general formula VII:



wherein R<sup>6</sup>, R<sup>7</sup>, and R<sup>9</sup> are independently selected from the group consisting of H, CF<sub>3</sub>, straight or branched alkyl of 1 to 20 carbon atoms, aryl, unsaturated straight or branched alkenyl or alkynyl of 2 to 10 carbon atoms, unsaturated straight or branched alkenyl of 2 to 6 carbon atoms substituted with a halogen, C<sub>3</sub>-C<sub>8</sub> cycloalkyl, heterocyclyl and phenyl, R<sup>8</sup> is selected from the group consisting of H, C<sub>1</sub>-C<sub>6</sub> alkyl, and COOR<sup>10</sup>, wherein R<sup>10</sup> is selected from the group consisting of H, an alkali metal, a C<sub>1</sub> to C<sub>6</sub> alkyl group, and C<sub>6</sub> to C<sub>20</sub> aryl.

47. (Original) The copolymer of claim 46 wherein the other ethylenically unsaturated monomers are one or more selected from the group consisting of methacrylic monomers and allylic monomers.
48. (Original) The copolymer of claim 40 wherein R<sup>1</sup> is selected from at least one of methyl, ethyl, n-propyl, isopropyl, n-butyl, isobutyl, and cyclohexyl.
49. (Original) The copolymer of claim 40 wherein the copolymer is substantially free of maleate monomer segments and fumarate monomer segments.
50. (Original) The copolymer of claim 40, wherein said copolymer has an equivalent weight of from 125 to 3000, based on etherified carbamate functional groups.
51. (Previously Presented) A curable composition comprising the copolymer of claim 40.
52. (Previously Presented) A curable composition comprising:  
a) the copolymer of claim 40 and  
b) at least one material having functional groups that are reactive with the copolymer of a).

Claims 53 – 54 (Cancelled)

55. (Original) The curable composition of claim 52, wherein the material (b) has functional groups selected from the group consisting of hydroxyl, methylol, methylol ether, carboxylic acid, amide, thiol, urea, carbamate, thiocarbamate, and mixtures thereof.
56. (Original) The curable composition of claim 55, wherein the material (b) is a polymer selected from the group consisting of acrylic, polyester, polyether and polyurethane polymers including mixtures thereof.
57. (Original) The curable composition of claim 55 wherein the material (b) is an aminoplast.

Claims 58 – 69 (Cancelled)

## **EVIDENCE APPENDIX**

None.

**RELATED PROCEEDINGS APPENDIX**

None.